

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A device for recognition of a presented object, ~~such~~ the device comprising

a hierarchical memory (HM) in which is stored a data set representative of candidate objects or events, each candidate object or event having one or more features and said data set being arranged as a hierarchical data set having

~~higher top~~ top level nodes comprising candidate objects or events, ~~and~~

lower level nodes corresponding to features of the candidate objects or events,

and

lowest level nodes corresponding to basic features of the candidate objects or

events,

wherein

top level nodes are composed of combinations of features from,

and are associated with, corresponding lower level nodes, ~~and~~

lower level nodes are composed of combinations of features from,

and are associated with, corresponding ~~higher~~ lowest level nodes,†

a direction of correspondence from lowest level to lower level to top level is Bottom Up, and

a direction of correspondence from top level to lower level to lowest level is Top Down,

a front end module (FEM) responsive to a feature of ~~the~~ a presented object or event to produce feature detection information;

a selective attention module (SAM), said SAM:

(a) receiving feature detection information from the FEM as a Bottom Up input;

(b) receiving information from higher level nodes in the HM as a Top Down input;

(c) directing the FEM to select a next feature from the HM for use as a Bottom Up input

to modulate the ~~modulating~~ flow of said feature detection information so as to determine a reduced set of candidate objects or events as potentially corresponding to the presented object or

event, said SAM further ~~receiving information~~ applying a decision function to a Top Down input from the higher level nodes ~~to select for effecting said modulating whereby the device selectively attends~~ feature detection information from the FEM for use as the next Bottom Up input to progressively exclude candidate objects and identify the presented object or event with enhanced efficiency.

2. (Original) The device of claim 1, wherein the device responds to successive feature detection information from the FEM to iteratively reduce remaining candidate objects or events and determine a recognition output indicative that:

- a) a remaining candidate object or event corresponds to the presented object or event;
- b) no candidate object or event matches the presented object or event;
- c) a candidate object constitutes a best match to the presented object or event; or
- d) a set of candidate objects or events constitutes a best match to the presented object or event.

3. (Original) The device of claim 1, wherein the SAM controls gating nodes of the hierarchical data such that one or more detected features excite corresponding nodes at a higher level to maintain active candidate nodes of the hierarchical data set, and the device excludes non-excited nodes from the set of candidate objects to identify the presented object or event.

4. (Currently Amended) The device of claim 1, wherein the hierarchical data set supports ~~top-down signal flow~~ Top Down processing to derive a measure of feature probabilities for application as Top Down inputs.

5. (Original) The device of claim 1, wherein a measure is defined on nodes of the hierarchical data set, and the device applies the measure to direct the FEM or modulate feature detection information.

6. (Currently Amended) The device of claim 1 wherein the device identifies the presented object or event by a candidate object or event represented by a higher level node of the hierarchical data set, wherein each node at the candidate object or event level represents a

different candidate object or event; such nodes may be at least partially active or inactive; wherein an inactive node may indicate, ~~for example,~~ that the corresponding object or event is no longer a candidate object or event; wherein when the recognition process begins, there is a set of candidate objects or events, as indicated by the activity of the corresponding nodes; as recognition proceeds, nodes at the candidate object or event level become inactive and the corresponding candidate objects or events are excluded; and wherein recognition may then occur when all but one node at the candidate object or event level has become inactive, ~~e.g., all but one object or event has been excluded.~~

7. (Currently Amended) The device of claim 1 wherein the hierarchical data set includes one or more higher levels above candidate objects or events corresponding to object or event category ~~or other type of higher level contextual constraint (respectively, relationships among object or event categories or relationships among other types of higher level contextual constraints);~~ wherein the recognition device defines a set of active candidate objects or events by object or event category, ~~or other type of higher level contextual constraint;~~ wherein the device may receive the object or event category, ~~or other type of higher level contextual constraint~~ as a user input to narrow the initial class of candidate objects or events, or the device may operate with one or more category ~~or other type of higher level contextual constraint~~ recognition processes to initially determine the category of active candidate objects or events.

8. (Original) The device of claim 1, wherein the hierarchical database contains one or more intermediate levels below the candidate object or event level, an intermediate level representing an object or event in terms of compositional elements.

9. (Original) The device of claim 8, wherein compositional elements of a lower level are represented by sub-elements they contain.

10. (Currently Amended) The device of claim 1, wherein nodes at different levels of the hierarchical data set are connected ~~in a bottom-up fashion,~~ to nodes at a higher level according to a compositional rule whereby lower level nodes representing an element or sub element are

connected to nodes at the next higher level if ~~the item represented by~~ that node is composed in part by the element or sub-element.

11. (Currently Amended) The device of claim 1, wherein bottom-up ~~signal~~ processing is arranged such that detection of a feature causes a corresponding feature node of the data set to excite the nodes of the data set connected to said corresponding feature node, and candidate object or event nodes that do not receive excitation become inactive for the remainder of the recognition process whereby nodes representing candidate objects or events that do not contain detected features are progressively excluded during the recognition process.

12. (Currently Amended) The device of claim 1, wherein the device applies top-down ~~signal~~ processing at intermediate and feature levels to compute a measure of feature probability from ~~the a current subset of (non-excluded) candidate objects or events, for example, by summation at each node of top-down signals (specified by the compositional rule) flowing into that node or by another automated procedure for defining a measure.~~

13. to 21. (Canceled)

22. (Original) A recognition method for identifying a presented stimulus, such method comprising the steps of:

- a) presenting an input stimulus for recognition;
- b) identifying a set of candidate objects or events, the candidate objects or events possessing features, wherein the candidate objects or events and features form an interconnected hierarchy wherein an object or event node at a higher level is linked to feature nodes at a lower level corresponding to the object or event node, and wherein a feature node at the lower level is linked to one or more corresponding object or event nodes;
- c) assigning a measure to features at the lower level, setting a window of attention identifying feature domain information of interest, detecting a feature in the window of attention, wherein said setting a window of attention is performed responsive to said measure so that processing of the detected feature efficiently reduces the candidate set; and

d) re-defining the set of candidate objects or events consistent with the detection of said feature.

23. (Original) The recognition method of claim 22, wherein the steps c) and d) are repeated to iteratively reduce the candidate set to a single candidate, thereby identifying the presented object or event.

24. (Original) The recognition method of claim 22, wherein the detection is carried out simultaneously of plural features in plural windows of attention to reduce the candidate set.

25. to 28. (Canceled)